# PHYS 532: Classical Electrodynamics

## Syllabus Spring 2021

## Contact Information

**Instructor:** Professor Anthony Chan, Department of Physics and Astronomy
**Email:** aac@rice.edu
**Office Hours**: I am available most weekday afternoons, please email me to set a meeting time.

## General Course Information

**Course Prerequisite:** PHYS 302 Intermediate Electrodynamics, or equivalent (for example, a course that covers most of the textbook *Introduction to Electrodynamics* by David J. Griffiths).
**Meeting Time:** Monday, Wednesday, Friday; 11:00am-11:55am
**Fully Online via Canvas:** https://canvas.rice.edu
**Format:** A lecture course with problem sets, a midterm exam, and a final exam

## Textbooks

**Required:** L. D. Landau and E. M. Lifshitz, *The Classical Theory of Fields*, Course of Theoretical Physics, volume 2, fourth revised English edition. ISBN: 0750627689.
**Recommended:** J. D. Jackson, *Classical Electrodynamics*, third edition, J. Wiley and Sons, 1999. ISBN: 9780471309321.

## Course Outline

1. **Foundations of Special Relativity**
2. **Relativistic Mechanics**
3. **Charges in Electromagnetic Fields**
4. **Electromagnetic Field Equations**
5. **Constant Electromagnetic Fields**
6. **Electromagnetic Waves**
7. **Fields of Moving Charges**
8. **Radiation of Electromagnetic Waves**

## Course Objectives and Learning Outcomes

The main objectives of the course are (i) to review and explore the topics listed in the Course Outline, at a level appropriate for a graduate course on classical electrodynamics, and (ii) to gain experience with the powerful and fundamental theoretical approach used by Landau and Lifshitz, which is based on special relativity and variational principles. By the end of the course students should be able to write down the basic formulae of classical electrodynamics, explain the underlying physical concepts, and solve related problems; all based on the class lectures, the textbook, and the problem sets.

## Grades, Problem Sets, Policies

**Grading Weights**
Problem Sets: 50%
Midterm Exam: 20%
Final Exam: 30%

**Problem Sets:** Will be assigned approximately once a week, and will usually be due *before the beginning of class* one week after assignment. Students are encouraged to discuss the problems with their classmates and with the instructor, but they must write up their homework solutions *independently*. Of course, you must not copy anyone else's solutions.

**Late Problem Sets:** The grade for a late problem set will be multiplied by a decaying exponential with a time constant of five days. Late problem sets must be given to the grader (not to the professor) with the date and time written on the front page.

**Absence Policy:** If a student misses a class they are responsible for catching up on any missed material. It is not necessary to notify the instructor of a missed class.

## Rice Honor Code

In this course, all students will be held to the standards of the Rice Honor Code, a code that students pledge to honor when they matriculate. If you are unfamiliar with the details of this code and how it is administered, please consult the Honor System Handbook at http://honor.rice.edu/honor-system-handbook/. This handbook outlines the University's expectations for the integrity of your academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process.

## Disability Resource Center

If you have a documented disability or other condition that may affect academic performance you should: 1) make sure this documentation is on file with the Disability Resource Center (Allen Center, Room 111 / adarice@rice.edu / x5841) to determine the accommodations you need; and 2) talk with the course instructor to discuss your accommodation needs.

## Syllabus Change Policy

This syllabus is only a guide for the course and is subject to change with advanced notice.